

A New Cowrie from the Estuaries of Northwestern Australia

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ABSTRACT A new species of cowrie in the genus *Erronea* (*Ipserronea*) is described from the muddy coastal estuaries of King Sound, Western Australia, at the mouth of the Fitzroy River. The new cowrie, here named *Erronea* (*Ipserronea*) *garyi* n. sp., is the smallest-known member of its subgenus and inhabits oyster and *Pinna* beds on intertidal mud flats adjacent to mangrove jungles and river inlets. This new mudflat-dwelling dwarf cowrie is the fifth-known species in the subgenus *Ipserronea*.

KEY WORDS Cowrie Shells, Cypraeidae, *Erronea*, *Ipserronea*, King Sound, Western Australia

INTRODUCTION

The muddy estuarine areas of coastal northwestern Australia are still unexplored malacologically and potentially house entire new molluscan faunas that have never before been seen or described. Collecting in these areas is extremely difficult and dangerous, especially when considering the soft, flocculent mud substrate, widely-fluctuating tidal cycles, and abundant resident salt water crocodiles. Because of these impediments, few malacologists and shell collectors have ever investigated these inhospitable brackish water environments. Recently, two intrepid Western Australian collectors, Gary Smith and Allan Archer of Derby, have been exploring the King Sound region in search of new and rare species of gastropods and have made several interesting discoveries. While investigating oyster banks exposed on mud flats at low tide, they uncovered a very small and apparently new species of cowrie that lived inside the valves of dead oysters and pen shells. Upon closer

examination, the new cowrie was found to represent a previously-unknown dwarf member of the subgenus *Ipserronea* of the genus *Erronea* (the *E. pyriformis* species complex; see Lorenz, 2017). The authors were made aware of this interesting new discovery by Thierry Vulliet of Arundel, Queensland, who generously sent specimens for study and who had originally received them from Josh Akerman of Broome, Western Australia. Because of the exhaustive field work of Smith and Archer and the generosity of Vulliet, we are here able to describe this new *Ipserronea* species and a new addition to the Australian cowrie fauna.

The holotype of the new cowrie is deposited in the Western Australian Museum in Perth, Western Australia and bears a WAM catalog number. Paratypes of the new species are deposited in the collections of the Department of Malacology, Los Angeles County Museum of Natural History, Los Angeles, California and bear LACM catalog numbers.

SYSTEMATICS

Class Gastropoda

Subclass Sorbeoconcha

Order Prosobranchia

Infraorder Mesogastropoda

Superfamily Cypraeoidea

Family Cypraeidae

Subfamily Erroniinae

Genus *Erronea* Troschel, 1863

Subgenus *Ipserronea* Iredale, 1935

Erronea (Ipserronea) garyi

Petuch, Berschauer, and Waller, new species
(Figure 1 A-L)

Description. Shell small for genus and subgenus, averaging around 20 mm in length, ovately pyriform, greatly inflated, with high humped dorsum; extremities pronounced and well-developed; anterior extremities narrow and pointed, with distinct constriction at juncture with body whorl; posterior extremities asymmetrical, with labial extremity being better-developed and extending farther from body whorl; margins heavily callused and thickened; base rounded, heavily callused, extending well beyond marginal line, giving shell globular appearance; dorsum pale tan or whitish-tan, with an extremely light wide band of flammules slightly darker than the dorsum, overlaid with numerous very small flecks of darker tan-brown; margins white, marked with 8-10 proportionally-large elongated brown spots; base and extremities pure white; apical pit on posterior end marked with large dark brown spot; single pale brown spot present along base of labial anterior extremity; columella with 17-20 small, thin teeth which are confined to apertural area and do not extend onto shell base; columellar teeth pale reddish-tan within aperture, becoming white along edge of base; labium with 16-18 large pointed teeth, pure white in color; interior of aperture white or pale

whitish-tan, with large pale reddish-brown patch at anterior end.

Type Material. HOLOTYPE - Length 23.2 mm, width 14.7 mm, from mud flats at the mouth of the Fitzroy River, King Sound, Western Australia, WAMS 72490 (Figure 1 A-C); **OTHER MATERIAL EXAMINED** - length 21.5 mm, from the same locality as the holotype, in the Berschauer Collection (Figure 1 D-F); length 21.4 mm, from the same locality as the holotype, in the Waller Collection (Figure 1 G-I); length 18.2 mm, from the same locality as the holotype, in the Petuch Collection (Figure 1 J-L); 2 subadult specimens, from the same locality as the holotype, in the Berschauer Collection.

Type Locality. The type lot was collected inside dead oyster shells on an exposed oyster bank, on the mud flats off Marv Island, King Sound, Western Australia.

Distribution. At present, known only from the King Sound area of Western Australia, but may be present in most of the muddy estuaries along extreme northern Western Australia and also Northern Territory.

Ecology. *Erronea (Ipserronea) garyi* prefers intertidal estuarine environments at the mouths of rivers, where it occurs on isolated oyster beds growing in extensive flocculent mud flats and muddy clay banks. Here, it occurs along with the delicate winged muricid *Timbellus bednalli*. These estuarine areas also house populations of the large Saltwater Crocodile, *Crocodylus porosus*.

Etymology. Named for Gary Smith of Derby, Western Australia, who discovered the new cowrie while exploring the muddy estuaries of the King Sound area.

Discussion. The subgenus *Ipserronea* Iredale, 1935, differs from the other subgenera and species groups within *Erronea* by having distinctly pyriform shell shapes, narrow apertures, and pronounced columellar teeth which often extend onto the shell base. Ranging from southern India eastward to Queensland, Australia and the Coral Sea, *Ipserronea* is now known to contain five species. We recognize the following taxa (whose biogeographic ranges were taken from Lorenz, 2017: 551):

1. *Erronea (Ipserronea) pyriformis* (Gray, 1824) (Taiwan south to the Philippines, New Guinea, Indonesia, and the Andaman Sea and Bay of Bengal) (Figure 2 C, D);
2. *Erronea (Ipserronea) carnicolor* (Preston, 1909) (eastern Australia, from the Torres Strait, the entire Queensland coast and Great Barrier Reef, to northern New South Wales, and the Coral Sea) (Figure 2 E, F);
3. *Erronea (Ipserronea) smithi* (Sowerby III, 1881) (Western Australia and Northern Territory, Australia, from Shark Bay to Arnhem Land) (Figure 2 A, B);
4. *Erronea (Ipserronea) angioyorum* (Biraghi, 1978) (southwestern India) (Figure 2 G, H);
5. *Erronea (Ipserronea) garyi* new species (northern Western Australia) (Figure 1 A-L).

The type species of Iredale's subgenus *Ipserronea* is *I. problematica*, which is now known to be a synonym of the eastern Australian *I. carnicolor* (see Iredale, 1935; Lorenz, 2017). As the type of the subgenus, *E. carnicolor* encompasses the main shell characters that set this species group aside from the other known subgenera of *Erronea*, such as *Adusta* (*E. adusta* group), *Solvadusta* (*E. subviridis* group), and *Palangerosa* (*E.*

cylindrica group). All five species exhibit a definite pyriform shape and inflated shell body and resemble the cypraeid genus *Ficadusta*.

Of the five known species of *Ipserronea*, *E. garyi* is morphologically closest to *E. smithi* (Sowerby III, 1881) from northwestern and northern Australia. Lorenz (2017: 552) considered *E. smithi* to be a subspecies of *E. pyriformis* but, because of very different shell characters and the different biogeographical ranges, we here consider *E. smithi* to be a full species, distinct from the widespread *E. pyriformis*. Although occurring in the same general region of Australia, *E. smithi* and *E. garyi* have completely different ecological preferences, with *E. smithi* preferring deeper offshore areas, most often in association with beds of *Pinctada* pearl oysters in 15-25 m depths, with open-oceanic water conditions (Lorenz, 2017: 552). Some specimens of *E. smithi* have been taken in depths as great as 120 m, where they were collected from fish traps. *Erronea garyi*, on the other hand, prefers muddy intertidal estuarine areas near the mouths of rivers, where it lives in association with *Ostrea* and *Saccostrea* oyster banks and is often exposed at low tide. To avoid the extreme summer heat and fluctuating salinities during exposure at low tide, the new species finds refuge within the valves of dead oysters (Gary Smith, personal communication) and all of the specimens in the type lot were collected in this kind of habitat.

The shell morphology of the estuarine *Erronea garyi* also differs from that of the deeper water *E. smithi*, with the new species being a much smaller shell, averaging only 19-20 mm, while its offshore congener is generally a larger shell, averaging 29-30 mm. The new species is also a much more inflated and globose shell, with a higher, more domed dorsum and a noticeably more rounded base than those seen on the more

flattened, dorsally-compressed *E. smithi*. The shell color of *E. smithi* is consistently a pale blue or greenish-blue, overlaid with two wide bands of large brown or purplish-brown rectangular flammules, while the color of *E. garyi* is a pale tan or whitish-tan with an extremely light wide band of flammules that is slightly darker tan than the dorsum. The flattened base of *E. smithi* has a characteristic bright yellow color that becomes darker on the anterior and posterior extremities, while the rounded base of *E. garyi* is simply pure white. The colors of the interiors of the apertures also differs greatly between the two Western Australian species, with the interior of *E. smithi* being a dark brown or deep purplish-brown while the interior of *E. garyi* is white or pale whitish-tan. For comparative photographic views of both species see Figure 3.

The general shell shapes also differ greatly between the two western Australian species, with *E. smithi* having a wider shell with broader and more flattened extremities, while *E. garyi* has narrower and more pointed extremities with a greater constriction at the body whorl juncture. The greatest difference between the two congeners is seen in the shape and form of the columellar teeth; in *E. smithi* the teeth at the posterior end of the columella are proportionally large, extend onto the shell base, and are colored a dark reddish-brown (Figure 2 B), while the posterior columellar teeth of *E. garyi*

are proportionally very small, do not extend onto the base of the shell, and are colored a faint reddish-tan only deep within the aperture (Figure 1 B). In regards to this last shell character, the new species somewhat resembles the southern Indian *E. angioyorum* (Figure 2 H).

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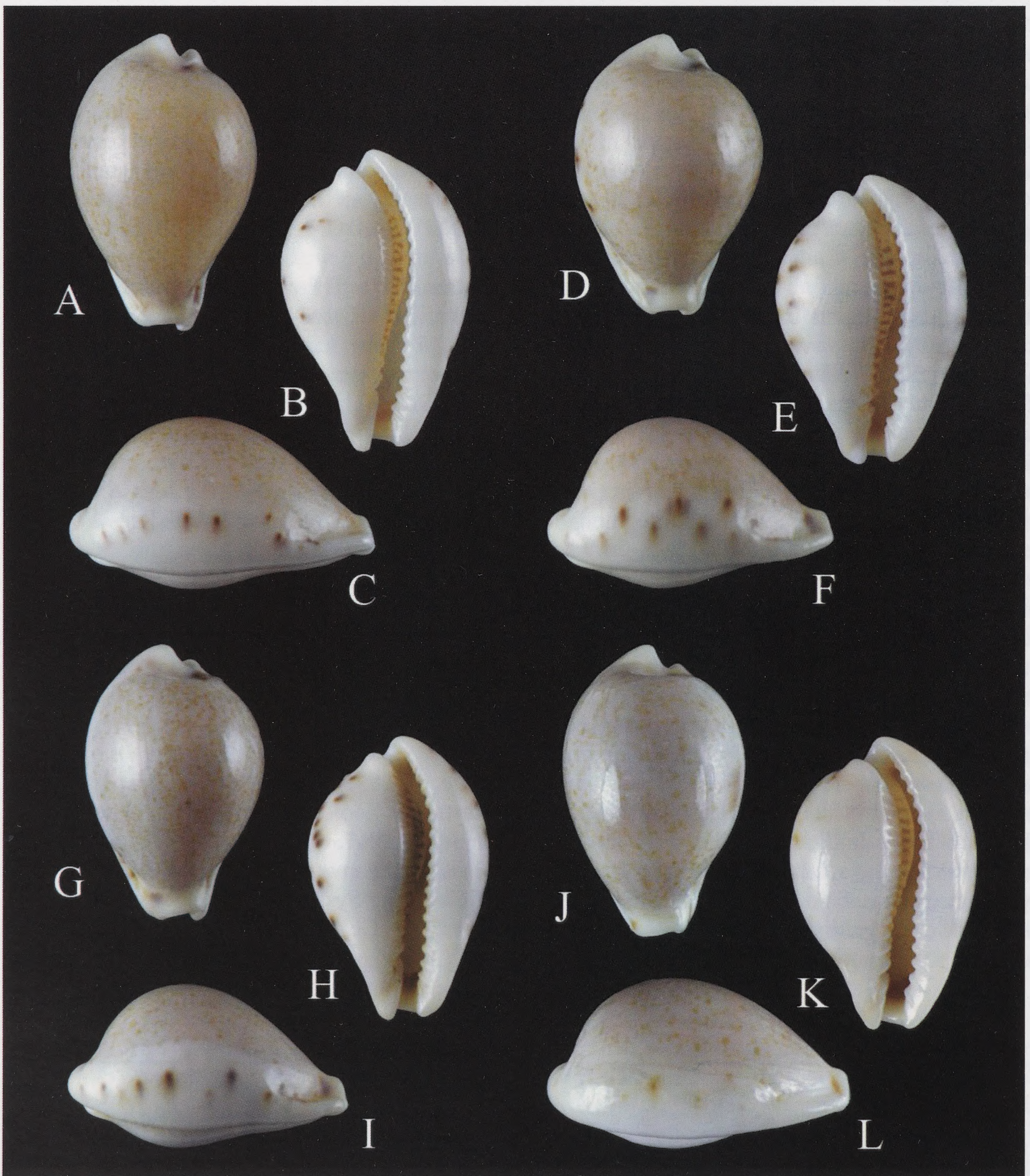


Figure 1. *Erronea (Ipserronea) garyi* Petuch, Berschauer, and Waller, new species from the Estuaries of Western Australia. A, B, C= Holotype, length 23.2 mm, King Sound, Western Australia, WAMS 72490; D, E, F= 21.5 mm specimen, King Sound, Western Australia, Berschauer Collection; G, H, I= 21.4 mm specimen, King Sound, Western Australia, Waller Collection; J, K, L= 18.2 mm specimen, King Sound, Western Australia, Petuch Collection.



Figure 2. Species of *Erronea* (*Ipserronea*) from the western Pacific and eastern Indian Oceans. A, B= *Erronea* (*Ipserronea*) *smithi* (Sowerby, 1881), length 26.3 mm, trawled from 50 m depth off Cape Leveque, Dampier Peninsula, Western Australia; C, D= *Erronea* (*Ipserronea*) *pyriformis* (Gray, 1824), length 31 mm, trawled from 30 m depth off Panglao, Bohol Island, Philippines; E, F= *Erronea* (*Ipserronea*) *carnicolor* (Preston, 1909), length 36 mm, trawled from 40 m depth off Tanum Sands, Queensland, Australia; G, H= *Erronea* (*Ipserronea*) *angioyorum* (Biraghi, 1978), length 27.6 mm, trawled by shrimpers from 80 m depth off Kerala, India.



Figure 3. Comparison between *Erronea (Ipserronea) garyi* and *Erronea (Ipserronea) smithi*. A-F = six views of the holotype of *Erronea (Ipserronea) garyi* Petuch, Berschauer, and Waller, new species, length 23.2 mm. G-L = six views of *Erronea (Ipserronea) smithi* (Sowerby, 1881), length 26.3 mm.